

Surface Optimization Techniques for Deployable Reflectors, Phase I

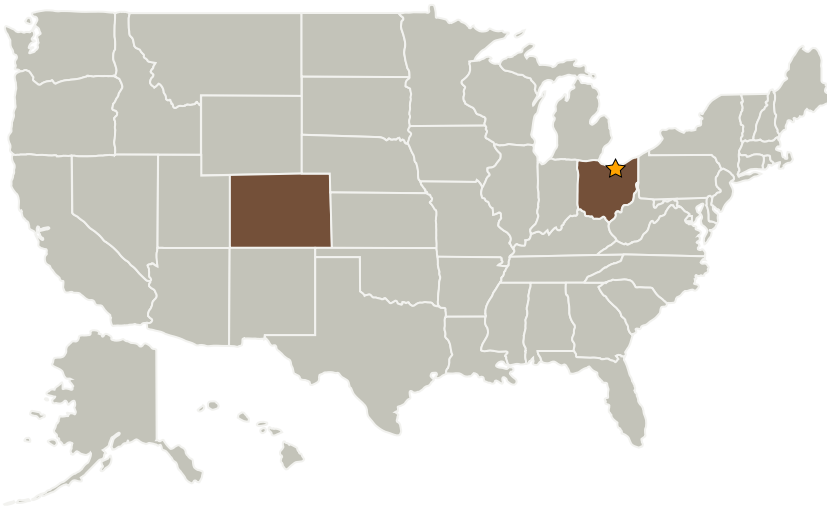


Completed Technology Project (2008 - 2008)

Project Introduction

Existing communications systems for spacecraft provide a choice between either large aperture (>3m) or high frequency (>X-band), but not both. These systems use either deployable mesh reflectors, which are limited in their operating frequency by the facets and RF reflectivity of the mesh itself, or rigid surface reflectors, which are limited in their aperture by the size of the launch vehicle fairing. Deployable solid-surface reflectors have the potential to enable both a large aperture and high frequency operation but are compliant and inherently difficult to fabricate to a precise surface contour. The proposed innovation is to develop methods for optimizing the surface contour of solid-surface deployable reflector systems using built-in adjusters. This allows for antenna systems with high data rate and high gain for interplanetary communications and other missions. Technical feasibility of this approach will be demonstrated in Phase 1 with the design, structural analysis, assembly, and demonstration of a tunable solid surface reflector thereby advancing the innovation to a TRL 5. The Phase 1 demonstration unit will incorporate tuning adjusters, an existing reflector shell, and a simplified backing structure. This will provide the methodology for a flight-ready demonstration unit to be completed as part of the Phase 2 contract.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Composite Technology Development, Inc.	Supporting Organization	Industry	Lafayette, Colorado

Primary U.S. Work Locations

Colorado	Ohio
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Robert M Taylor

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.2 Radio Frequency
 - └ TX05.2.6 Innovative Antennas